



OMSAPC ADVISORY CIRCULAR

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR AND WASTE MANAGEMENT

A/C NO. 36-A

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SUBJECT: Warning Devices for Emission Control System Maintenance

A. Purpose

The purpose of this advisory circular (A/C) is to combine A/C's 36 and 36-1 into a single A/C that clarifies the intent of both A/C 36 and A/C 36-1. Those A/C's were issued to clarify the provisions of the regulations [40 CFR §86.078-25(a)] with regard to the need for warning devices to alert vehicle operators to the need for emission control system maintenance. This advisory circular also applies to corresponding sections of the regulations for heavy-duty vehicles and engines and motor-cycles. This advisory circular supersedes A/C's 36 and 36-1 which should be discarded.

B. Background

1. The regulations require manufacturers to obtain EPA approval prior to performing maintenance on durability vehicles for those components not specifically listed in §86.078-25(a)(1)(i)(A).¹ In the case of scheduled maintenance, the regulations state that EPA approval will be based on a satisfactory showing by the manufacturers that the maintenance is likely to be performed on vehicles in use. Such a showing should include either a warning device signalling the need for such maintenance or data showing that failure to perform the maintenance would result in a degradation of operator-perceived vehicle performance characteristics such as general driveability. EPA may elect to confirm by vehicle drive evaluation that driveability or performance degradations claimed by a manufacturer are sufficiently overt to provide incentive for maintenance. The showing may also require other proof of incentive as outlined in A/C 12A (such as free maintenance).

2. In the case of unscheduled maintenance, the regulations [40 CFR 86.078-25(a)(5)]¹ state that EPA approval will be based on the determination that the need for maintenance is indicated by an overt indication of malfunction. An overt indication of malfunction may include activation of a warning device, either audible or visual. This general concept applies to all emission control devices including but not limited to EGR systems, catalytic converters, spark advance modulation devices, direct engine temperature sensing modulation devices, and oxygen sensors.



3. The regulations place restrictions on the frequency with which scheduled and unscheduled maintenance may be performed on catalyst and EGR systems and specifically condition the approval of such maintenance on the use of warning devices. Scheduled maintenance of EGR systems may be approved without a signal to the operator if EPA determines that failure to perform EGR system maintenance is not likely to result in an improvement to vehicle performance. Limitations were placed on catalyst and EGR system maintenance because it was concluded that performance of such maintenance on in-use vehicles would be unlikely without additional incentive. Warning devices are required to provide an incentive for in-use maintenance.

4. On December 14, 1973, Advisory Circular No. 36 was issued to clarify the provisions of the regulations which require the use of warning devices indicating the need for maintenance to emission control systems. It specifically addressed warning devices associated with EGR and catalytic converter systems since the regulations contain specific provisions on warning devices for those systems (as discussed in paragraph 3, above), but expressly was not limited to EGR and catalytic converter systems. Advisory Circular No. 36 also described the types of audible and visual warning devices that would be acceptable. Acceptable visual signals were specified as lights on the instrument panel. However, subsequent information indicated that visual signals other than lights were available which would be acceptable.

5. On September 6, 1974, A/C 36-1 was issued to revise A/C 36 to permit the use of visual warning devices other than lights on the instrument panel.

6. Recently, several manufacturers have asked EPA whether the regulations require warning devices to signal the need for oxygen sensor maintenance. Oxygen sensors are components of emission control systems. In some cases, oxygen sensors may require maintenance before the end of the useful life of the vehicle. Accordingly, the regulations and the provisions of this A/C are applicable to oxygen sensors which are components of emission control systems (as noted in paragraph 2, above).

C. Applicability

The provisions of this A/C are applicable to all new motor vehicles and new motor vehicle engines.

D. Types of Acceptable Warning Devices

1. Warning devices may be audible and/or visual signals. An activated audible signal must be a noise readily heard within the vehicle. An activated visual signal must be a light or indicator on the instrument panel readily apparent both night and day. For example, if the visual signal is a light, it shall be of at least the same brightness as the brake failure or charge indicator warning light. A visual indicator must provide sufficient information such as "EGR" or "CATALYST" to alert



the operator not only to the need for maintenance, but also to the system requiring maintenance. Colored markings on the odometer will not be sufficient notice to be acceptable, but flags that drop down and cover the numerals on the odometer may be acceptable.

2. There are two types of warning devices that are expected to be used by manufacturers to signal the need for scheduled maintenance: those activated by mileage and those activated by engine-hour accumulation. The mileage interval must be at least 12,500 miles (major engine tuneup interval) of durability mileage accumulation, or the equivalent in hours of engine operation.² Alternate mileage (or hours) may be approved if the manufacturer has demonstrated, as outlined in A/C 12A, that major engine tuneups are likely to be performed in-use at an interval other than 12,500 miles or that the subject maintenance is likely to be performed at an interval different than that at which major engine tuneups are performed. The manufacturer should submit supporting data in his Part I Application to substantiate the equivalence of his engine-hour interval and the specified mileage interval if that hour interval is different than that assumed in this A/C.²

3. A warning device which signals the need for unscheduled maintenance may be activated either directly by the failure of an emission control system component itself or by the failure of another component whose failure would endanger the effectiveness or durability of the emission control system. However, if the warning device associated with a catalyst is activated by the failure of a component other than the catalyst, maintenance may nevertheless be performed only once. A warning device is considered to be associated with a catalyst if one of the maintenance actions to be performed in response to the activated warning device is servicing of the catalyst itself or if, in the case of a visual device, the device says "catalyst." If the manufacturer wants to be able to perform maintenance, such as replacing a misfiring spark plug, as many times as the warning device is activated, the warning device may not be labeled a catalyst warning device and servicing the catalyst will not be one of the maintenance options available (even though the maintenance may be related to the protection of the catalyst).

4. Where possible, performance of the required maintenance should be sufficient action to reset the warning device. A warning device which is not replaced or reset by the action of performing maintenance may also be approved if sufficient assurance is given that the warning device will be replaced or reset when the maintenance is performed and the device is not easily reset or deactivated at other times. The warning device may not be self-resetting, i.e., deactivated after a time or mileage interval.

5. The maintenance instructions furnished to the ultimate purchaser of the vehicle in accordance with 40 CFR §86.077-38(c)(1)¹ shall explain the conditions under which emission control system maintenance is to be performed (e.g., what type of warning device is employed and whether the device is activated by component failure or the need for periodic maintenance).



E. Conditions Under Which Maintenance May Be Performed On Certification Vehicles and Engines

1. Warning devices which signal the need for scheduled or unscheduled maintenance must be installed prior to the beginning of mileage accumulation on each test vehicle or engine representing vehicles or engines on which such devices are intended to be equipped in use.

2. For maintenance based on the activation of a warning device, audible or visual warning devices must be activated indicating either the need for scheduled or for unscheduled maintenance. For scheduled maintenance the device shall be activated within 250 miles of the mileage point (or equivalent hours) listed in the manufacturer's maintenance schedule submitted prior to the initiation of durability testing. (For scheduled EGR system maintenance, that mileage point shall correspond to the scheduled major engine tuneup point [40 CFR 86.078-25(a)(3)].¹)

3. EPA must be contacted as soon as possible after activation of any device alerting the vehicle operator to the need for either scheduled or unscheduled maintenance and prior to any diagnosis or maintenance. EPA may, in accordance with 40 CFR 86.078-25(a)(11),¹ elect to verify the activation of the warning device prior to approving performance of the maintenance. EPA may also elect to observe the performance of the maintenance.

4. In the case of an engine-hour-activated warning device, EPA will determine, as discussed in Section D.2 above, if the hour operation interval is equivalent to a minimum mileage interval of 12,500 miles (or an alternate mileage interval approved by EPA as provided in A/C 12A). An hour meter is necessary in the test vehicle to demonstrate that the engine hour activated warning device is being activated correctly.

F. Improper Activation of Scheduled Maintenance Warning Devices

1. If the warning device is activated prior to a scheduled point (i.e., more than 250 miles before the scheduled point), no emission control maintenance may be performed but the vehicle shall be stopped. EPA shall be given the opportunity to approve a plan for diagnosing the malfunction and to verify the existence of any malfunction before corrective unscheduled maintenance may be performed on the warning device. EPA will determine what corrective action, if any, may be taken, including the resetting of the device to activate at the scheduled point.

a. If EPA makes the determination that the failure is not likely to recur (see Section H., below) corrective unscheduled maintenance on the warning device will be permitted, and the vehicle allowed to continue mileage accumulation. In order to make this determination, EPA may require demonstration that the device would normally be activated only at the scheduled interval. If the action required to correct the device failure



involves replacement of the sensor portion of the device, such demonstration may require the simulation of the mileage or engine-hour accumulation on the replacement device before it is installed on the vehicle. A description of the procedure for simulation must be submitted to and approved by EPA before the vehicle is repaired.

b. If EPA makes the determination that the failure is likely to recur, see Section H., below.

2. If the warning device is not activated at the scheduled mileage point, the manufacturer is advised to stop the vehicle no later than 200 miles (or equivalent hours) after the scheduled mileage point (in order to have sufficient time to perform the emission test required before the start of the engine and/or emission control maintenance, which must be started within 250 miles of the scheduled mileage point). EPA shall be given the opportunity to approve a plan for diagnosing the malfunction and to verify the existence of any malfunction before corrective unscheduled maintenance may be performed on the device. EPA will determine what corrective action, if any, may be taken, including the resetting of the device to activate at the next scheduled point.

a. If EPA makes the determination that the failure is not likely to recur, corrective unscheduled maintenance on the warning device will be permitted, the emission control maintenance performed, the device reset, and the vehicle allowed to continue mileage accumulation. In order to make this determination, EPA may require demonstration that the device would normally be activated at the scheduled interval. If the action required to correct the device failure involves replacement of the sensor portion of the device, such demonstration may require the simulation of the mileage or engine-hour accumulation on the replacement device before it is installed on the vehicle. A description of the procedure for simulation must be submitted to and approved by EPA before the vehicle is repaired.

b. If EPA makes the determination that the failure is likely to recur, see Section H., below.

G. Improper Activation of Unscheduled Maintenance Warning Devices

It is possible that a warning device intended to signal the need for unscheduled maintenance activates, and that upon proceeding to perform the indicated maintenance (which is subject to prior EPA approval as unscheduled maintenance) it is determined that the emission control component does not require maintenance. In such a case, EPA shall be given the opportunity to approve a plan for diagnosing the malfunction of the warning device and to verify the existence of any malfunction before corrective unscheduled maintenance may be performed on the warning device. EPA will determine what corrective action, if any, may be taken.



1. If EPA makes the determination that the failure is not likely to recur, corrective unscheduled maintenance on the warning device will be permitted, and the vehicle allowed to continue mileage accumulation. In order to make this determination, EPA may require demonstration that the device would normally be activated in response to certain conditions. If the action required to correct the device failure involves replacement of the sensor portion of the device, such demonstration may require the simulation of the mileage or engine-hour accumulation on the replacement device before it is installed on the vehicle. A description of the procedure for simulation must be submitted to and approved by EPA before the vehicle is repaired.

2. If EPA makes the determination that the failure is likely to recur, see Section H., below.

H. Procedures for Cases of Recurring Failures of Warning Devices

If the EPA makes the determination that the failure of a warning device system or a specific component of a warning device system, is likely to recur because it is inherently defective in terms of design or materials, the manufacturer has two options:

1. The vehicle equipped with the specific component or warning device that EPA has determined to be subject to recurrent failure (and all of that manufacturer's other durability vehicles which are similarly equipped) may continue mileage accumulation without performance of the applicable emission control maintenance until mileage accumulation is completed or until a substitute warning device is approved in accordance with the provisions of Section I. If none of the durability vehicles has received emission control system maintenance based upon the warning device in question, the manufacturer may seek certification of the vehicles without warning devices and reflect in the maintenance instructions that no maintenance to the emission control system in question is necessary.

2. The vehicle equipped with the specific component or warning device system that EPA has determined to be subject to recurrent failure may be stopped (and all of that manufacturer's other durability vehicles which are similarly equipped, will also be stopped at least 1000 miles prior to the next scheduled maintenance point for each vehicle) until the manufacturer has qualified a substitute warning device in accordance with Section I below. If the warning device is intended to signal the need for unscheduled maintenance, the vehicles affected must be stopped without further mileage accumulation until the manufacturer has qualified an update of the warning device in accordance with Section I. The substitute warning device or component would then be installed in all such durability vehicles, pre-set as appropriate to the mileage or engine-hour point at which each vehicle was stopped, and mileage accumulation resumed. If this alternative is elected, maintenance may be performed as the signal for such maintenance is activated after the restarting of the vehicles.



I. Substitution of Warning Devices

If the manufacturer wishes to substitute for use on durability vehicles or production vehicles warning devices which are not in all material respects identical to the devices installed on the durability vehicles, EPA may elect to specify the requirements it deems necessary to demonstrate the performance and reliability of the substitute device. These requirements may consist of: (a) durability vehicle(s) run for up to 50,000 miles with the new warning device installed and functioning (b) a simulated 50,000 miles on a test stand approved in advance by EPA, or, (c) such combination of (a) and (b) above as may be determined to be appropriate.

J. Use of Warning Device Test Systems

1. A manufacturer may elect to install a warning device test system. The function of this test system would be to determine if the warning system is operational and to allow for the performance of unscheduled maintenance to the warning system should the system malfunction. Examples of acceptable systems are:

- a. A "press-to-test" button to indicate if the warning device is functioning.
- b. A circuit that tests the warning device during engine starting.

2. Use of any such system requires explanation to the vehicle owner in the maintenance and use instructions.

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¹Or corresponding sections of the regulations for previous and subsequent model years and other mobile sources (heavy-duty vehicles and engines and motorcycles).

²One hour of engine operation will be assumed to be equivalent to:

- 30 miles for light-duty classes
- 50 kilometers for motorcycles
- 33.3 miles for gasoline-fueled heavy-duty engines
(for vehicle or dynamometer operation)
- 33.3 miles for Diesel heavy-duty engines
(for vehicle operation)
- 100 miles for Diesel heavy-duty engines
(for dynamometer operation)